WATER CONSERVATION NEWS

"Building sustainability, reliability, and accountability through efficient water use"

In this issue...

Democracy at Work

By Marsha Prillwitz, Chief, Office of Water Use Efficiency

Marsha Prillwitz

In this issue of Water Conservation News we are focusing on water recycling and highlighting the recommendations produced by the Water Recycling Task Force. As the new Chief of the Office of Water Use Efficiency, I had the privilege of attending the Task Force's last official meeting.

I was impressed with the dedication of the task force members and other participants to express their issues, listen carefully to different views, and work toward agreement. This meeting was the culmination of exhaustive labors over the past year to develop and present their recommendations to the public and the Legislature. Tough issues were raised and changes were proposed, discussed, modified and ultimately approved by the group. Not everybody got exactly what he or she wanted, but by the end of the day, everyone had agreed to the full set of recommendations.

Balancing the mix of science, technology, economics, politics and culture requires strong communication and conflict resolution skills in all participants. We need to continue to foster the use of those skills while providing an environment where a process emphasizing cooperation, connection, and compassion can flourish.

It's not always easy to overcome the urge to forge ahead single-handed on a path we are certain is "right." Involving communities, other agencies, and people of all views is an important feature of a fully participatory democracy. It is a dynamic process which is not always pretty and sometimes full of surprises. Taking the time to create the space for all to participate, to voice their needs, concerns, and wisdom and to share in the decision making is necessary for success and well worth the effort.

A job well done, Recycled Water Task Force!

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Water Recycling Objectives

By Rich Mills and Fawzi Karajeh

In recent years "water recycling" has become an umbrella term encompassing the process of treating wastewater, storing and distributing the recycled water, and the actual use of the recycled water. Use of recycled water is motivated with a particular objective in mind and is often evaluated as one of several alternatives before determining that recycled water use is the most cost-effective means of meeting one or more objectives. These objectives, which have led to the use of recycled water in California, include:

1. an incidental secondary benefit to the disposal of wastewater, primarily crop production by irrigation with effluent;
2. a water supply to displace the need for other sources of water;
3. a cost-effective means of environmentally sound treatment and disposal of wastewater; and
4. a water supply for environmental enhancement.

Historically, agricultural use of recycled water has predominated in California and occurred mostly in the Central Valley where farmland was located adjacent to wastewater treatment facilities. The farm land offered a convenient place to dispose of effluent, and sometimes the sale of recycled water to nearby farmers offered a source of income to reduce costs to sewer users even when facilities were available for discharge to surface waters. As treatment standards were raised to protect the environment, land application was looked at more seriously as a cost-effective means of treatment and disposal of wastewater as opposed to discharge into streams. However, in recent decades, the emphasis in promoting water reuse has been more on the water supply benefits to meet demands in water-short areas. Water recycling is evaluated in comparison with other means of enhancing water supplies. Most projects in California now occur in urban areas, and uses have shifted more toward urban uses, such as landscape irrigation and industrial use. Environmental enhancement, such as wetlands restoration, can be another motivation.

Aside from meeting one or more of the major project objectives, there are several potential secondary benefits. Water recycling can:

1. provide additional reliable local sources of water, nutrients, and organic matter for agricultural soil conditioning and reduction in fertilizer use;
2. reduce the discharge of pollutants to water bodies, beyond levels prescribed by regulations, and allow more natural treatment by land application;
3. provide a more secure water supply during drought periods; and
4. provide economic benefits resulting from a more secure water supply.

Continued - See "Objectives" on page 8

Mission Statement of the Office of Water Use Efficiency

"To advance the efficient management and use of California's water resources in cooperation with other government agencies and the private sector through technical and financial assistance."

Governor's Recycled Water Task Force Accomplishes its Mission

By Fawzi Karajeh and Nancy King

California's Recycled Water Task Force presented its report to the Department of Water Resources and the Legislature at its eighth and final meeting on May 13, 2003 in Sacramento. Assembly Member Jackie Goldberg was on hand at the final meeting to help highlight the importance of recycled water in meeting the water supply and environmental needs of California. Other attendees included Agency Secretaries Mary Nichols of the Resources Agency and Winston Hickox of the California Environmental Protection Agency; Director Thomas Hannigan of the Department of Water Resources, Deputy Director Kevin Reilly of the Department of Health Services, Director Patrick Wright of the California Bay-Delta Authority, and Chair Arthur Baggett of the State Water Resources Control Board. The 40-member Task Force was established pursuant to Assembly Bill No. 331, which was authored by Assembly Member Goldberg and signed by Governor Davis in 2001. Following its mission set forth in AB 331, the Task Force identified opportunities for and constraints and impediments to increasing the use of recycled water and made recommendations addressing these in its report. The potential exists to increase the amount of recycled water use in California from the current rate of approximately 500,000 acre-feet annually to about two million acre-feet annually by 2030. This could free up enough fresh water to meet the household water demands of 30 to 50 percent of the additional 17 million new Californians expected by 2030.

Resources Secretary Mary Nichols remarked during the final Recycled Water Task Force meeting in Sacramento on May 13, "DWR and CALFED have incorporated water recycling in the water supply planning for the State. DWR has provided planning assistance in regional studies and a coordination and promotional role in facilitating water recycling without compromising the health and safety of the public. My Agency supports the Task Force report and will facilitate the implementation of the Task Force recommendations in cooperation with other State, federal, local agencies, communities and other stakeholders."

Director Thomas Hannigan during the meeting noted "Water recycling is an important component of the state's water management strategy that will contribute toward reliable and sustainable water supplies for the full range of beneficial uses to the year 2030 . . . California has a strong record of safe use of recycled water. Active public dialogue and participation in planning water recycling projects; the development of comprehensive education curricula and sound information programs, and strengthening water recycling technical assistance programs are key factors that will help maintain and strengthen public confidence that will move the safe use of recycled water forward . . . DWR will continue to provide technical, biophysical and engineering-oriented knowledge and will continue to support, promote, and provide outlets for scientific research on water recycling production and use."

A copy of the Task Force report is available at www.owue.water.ca.gov/recycle or by contacting Fawzi Karajeh, DWR, at (916) 651-9669 or fkarajeh@water.ca.gov.

Members and staff of the Governor's Recycled Water Task Force

From left to right: Jonas Minton, Fethi BenJemaa, Fawzi Karajeh, Eric Schockman, Nancy King, Rich Mills, Luana Kiger.

Recycled Water Task Force Recommends Ways to Increase Water Supplies

By Fawzi Karajeh, Rich Mills, Fethi BenJemaa, and Nancy King

Over the course of nearly 14 months the Recycled Water Task Force conducted intensive study in collaboration with many other experts, the public at large, and State staff to develop recommendations for actions at many levels. The recommendations of the Task Force are not restricted to legislative actions or statutory changes. Many can be implemented by State or local agencies without further legislative authorization or mandate. Some recommendations draw upon the experience of many agencies and provide advice that can be used as a toolbox for communities to improve their planning for recycled water projects. The Task Force identified and adopted 26 issues with respective recommendations to address obstacles, impediments, and opportunities for California to increase its recycled water usage. Recommendations associated with thirteen of these issues were adopted as key recommendations deserving of more immediate attention. The Task Force intends for its report to be used as a working tool to guide the Legislature, state government, public agencies, the public and all water recycling stakeholders towards the safe and successful expansion of recycled water use to help meet the State's future water supply needs. For more information about the recommendations of the Task Force visit www.owue.water.ca.gov/recycle.

Issues and Recommendations Made by the Recycled Water Task Force

Funding for Water Recycling Projects State funding for water reuse/recycling facilities and infrastructure should be increased beyond Proposition 50 and other current sources. The California Water Commission in collaboration with DWR and SWRCB to seek federal cost sharing legislation for water recycling.

Community Value-Based Decision-making Model for Project Planning Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water recycling projects.

Leadership Support for Water Recycling State government should take a leadership role in encouraging recycled water use and improve consistency of policy within branches of state government and local agencies should create well-defined recycled water ordinances and enforce them.

Educational Curriculum The State should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate recycled water education into their curricula.

State-sponsored Media Campaign The State should develop a water issues information program, including water recycling, for radio, television, print, and other media.

Uniform Plumbing Code Appendix J The State should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and recycled water systems, and adopt a California version that will be enforceable in the State.

DHS Guidance on Cross-connection Control The Department of Health Services should prepare guidance that would clarify the intent and applicability of Title 22, Article 5 of the California Code of Regulations pertaining to dual plumbed systems and amend this article to be consistent with requirements included in a California version of Appendix J that the Task Force is recommending to be adopted.

Health and Safety Regulation The Department of Health Services should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and State health regulation associated with the use of recycled water.

Incidental Runoff The State should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.

Uniform Interpretation of State Standards The State should create uniform interpretation of State standards in State and local regulatory programs by taking specific steps recommended by the Task Force.

Water Softeners The Legislature should amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on local ability to impose bans on or more stringent standards for residential water softeners. Within the current legal provisions on water softeners, local agencies should consider publicity campaigns to educate consumers regarding the impact of self-regenerative water softeners.

Issues and Recommendations Made by the Recycled Water Task Force

(continued)

Uniform Analytical Method for Economic Analyses A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water recycling projects for use by local, State, and federal agencies.

Research Funding The State should expand funding sources to include sustainable State funding for research on recycled water issues.

University Academic Program for Water Recycling The State should encourage an integrated academic program on one or more campuses for water reuse research and education, such as through State research funding.

Funding Coordination A revised funding procedure should be developed to provide local agencies with assistance in potential State and federal funding opportunities and a Water Recycling Coordination Committee should be established to work with funding agencies.

Regional Planning Criterion State funding agencies should make better use of existing regional planning studies to determine the funding priority of projects. This process would not exclude projects from funding where regional plans do not exist.

Funding Information Outreach Funding agencies should publicize funding availability through workshops, conferences, and the internet.

Department of Water Resources Technical Assistance Funding sources should be expanded to include sustainable state funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.

Project Performance Analysis Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing recycled water projects in terms of costs and benefits and recycled water deliveries.

Recycled Water Symbol Code Change The Department of Housing and Community Development should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.

Stakeholder Review of Proposed Cross-connection Control Regulations Stakeholders are encouraged to review Department of Health Services draft changes to Title 17 of the Code of Regulations pertaining to cross-connections between potable and nonpotable water systems.

Cross-connection Risk Assessment The Department of Health Services should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water.

Permitting Procedures Various measures should be conducted to improve the administration and compliance with local and state permits.

Source Control Local agencies should maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.

Economic Analyses Local agencies are encouraged to perform economic analyses in addition to financial analyses for water recycling projects and state and federal agencies should require economic and financial feasibility as two funding criteria in their funding programs.

Statewide Science-based Panel on Indirect Potable Reuse As required by AB 331, the Task Force reviewed the 1996 report of the California Indirect Potable Reuse Committee and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time. However, it is recommended to convene a new statewide independent review panel on indirect potable reuse to summarize existing and on-going scientific research and address public health and safety as well as other concerns such as environmental justice, economic issues and public awareness.

Recycled Water Enhancing Wetland Habitats in California

By Fawzi Karajeh, Water Recycling and Desalination Branch, OWUE, and Teng- Chung Wu, Mt. View Sanitary District

Constructed wetlands have been used in California for decades to further purify treated wastewater (recycled water); that treated wastewater is also used to maintain and enhance the wetlands. Currently in California about 30,000 acre-feet annually of recycled water is being used as a water supply for environmental enhancement. Constructed wetland systems incorporate the natural functions of wetlands to help remove pollutants from treated wastewater. Constructed wetlands utilizing recycled water could also provide control of storm water by providing a significant volume of water during runoff events.

The concept of wetlands is to have appropriate plant species adapted to saturated soil conditions and tolerant of periodic inundation by runoff and capable of absorbing and transforming some of the contaminant to untoxic forms. Pollutant removal in wetlands can occur through a number of mechanisms including sedimentation, filtration, volatilization, adsorption, absorption, microbial decomposition and plant uptake. Nutrients (nitrate, ammonia, phosphate) in water samples are one of the compounds that wetlands target to remove. Constructed wetlands may have an additional benefit by being a harbor for a variety of wildlife species that utilize the plants and invertebrates thriving in the area.

The Mountain View Sanitation District in Martinez is managing some of these wetlands. The district was established in 1923 to provide sewage collection and treatment services for portion of the City of Martinez and the unincorporated area of Contra Costa County. It now operates and maintains a 100-mile-long sewer system with four pump stations, and a tertiary quality wastewater treatment plant now uses ultraviolet light disinfection system, which replaced a chlorine disinfection system. In 1974, Mt. View Sanitary District began reclaiming all its effluent by constructing a 20-acre wetland (Moorhen Marsh) within the plant site and discharging all its effluent to the wetland to create and maintain a wildlife habitat. The water from Moorhen Marsh flows to a 115-acre natural wetland habitat. The district now treats 2.0 million gallons per day of sewage from 25, 0000 residents and wastewater for business and manages 135 acres of wetlands. These marshes are home and temporary stopover to about 100 species of resident and migratory birds and other wildlife. This project is providing opportunities for bird watching, photographing, observation of plants and wildlife and for environmental education. Since 1966, the District has been conducting an Interpretive Center Program for elementary school classes in Contra Costa County. It estimated that currently over 1,500 students and 400 chaperones attend field trips to the wetlands each year.

Mt. View Sanitary District has received numerous awards from governments and professional associations including the California Department of Toxic Substance Control and the National Wildlife Federation. For more information about Mt. View Sanitary District's Wetland Habitats Project contact Dr. Teng-Chung Wu at (916) 925-228-5635 or teng@mvsd.org

It's Not Too Late For a Sprinkler Tune Up

By Julie Saare-Edmonds

Generally sprinkler tune-ups are recommended in the late winter or early spring before operating the system the first time, but spring can be so busy for many people that they never get around to it. Now that we're in the height of summer, a sprinkler tune-up would be a good thing to do because there are still several weeks left to the irrigation season. There is always the potential to save water by using a sprinkler system that is running well versus a system out of adjustment.

July is considered the peak month for irrigating in most climate zones so the sprinkler timer should be set at maximum. Observe the landscape to see if it could do with less; it is not unusual for timers to be set to deliver 1-1/2 to 2 times (or more) the amount of water that is actually needed. Adjust the schedule, especially if water runs off. If runoff occurs split the run times over a period of time to allow it to sink in. Runoff may also be a sign that too much water is being applied. Repair any leaks or broken sprinklers with the correct parts. Adjust any heads that are too low, misaligned, spray out of the zone, or don't spray far enough. Clean out nozzles and filter baskets if needed. Remove the most distant heads and flush out the lines. Replace the sprinklers and run the system one valve at a time to check operation of each sprinkler head. Fine-tune sprinkler heads with a screwdriver so that they will spray correctly.

Further adjust the system by turning the flow control handle on each valve if necessary. Continue to observe how the system operates to see if efficiency can be improved even more. Once the system is running well, adjusting the schedule to coincide with the change of seasons is the most effective way to reduce water use in the landscape. One way to look at the schedule is to imagine a curve shaped like

Continued - See "Tune Up" on page 13

Design and Plant Selection Ideas for Water Wise Landscapes

By Julie Saare-Edmonds

Water wise landscapes usually do not just happen, except in nature where time and natural processes select the plants that will survive and even flourish in a particular location. In an urban landscape we can shorten nature's timeline by putting together what we know about climate, soils and plants and coming up with a workable, enjoyable and sustainable landscape. We need to think about what we want and need from a landscape. Installing a landscape without examining our needs will result in wasted time, money, water and effort. Do we need shade? What about screening, vegetable gardens, play areas, pet areas, butterflies and bees?

Matching garden style with the house style is really an aesthetic consideration, but since many of the houses in California were built in a Mediterranean style, and California has a Mediterranean climate, it makes sense in several ways to use Mediterranean climate plants. Plants adapted to Mediterranean climate can be found in South Africa, Chile, Western Australia, the Mediterranean Basin and California. Using these plants, many of which have silvery foliage to reflect intense sunlight, makes sense because they are adapted to the warm and often hot, dry summer climate we have throughout most of California. This is especially true of California natives.

Another consideration in a resource-friendly landscape is maintenance. Excessive mowing and pruning adds extra matter to the waste stream, contributes to air pollution, and takes a lot of time. Minimize the time spent mowing and pruning by choosing the right kinds of plants to begin with. Do a little research about the plants you like by reading about them in a good gardening encyclopedia such as Sunset Western Garden Book. By using good references you can select plants that will fit in the space and avoid those that will grow too large and require excessive maintenance. Keeping lawn areas small, using groundcovers to fill spaces instead of grass, and using smaller trees and shrubs are the easiest ways to minimize green waste production. Going a step further, grasscycling while you mow and composting leaves and prunings onsite can divert most of a site's green waste from entering the landfill.

Traditionally, landscape design incorporates the principles of balance, unity and rhythm to determine how plants and other landscape elements are arranged. These principles can still be followed in a water wise landscape even if the practice of hydrozoning is incorporated as well. Hydrozoning is the practice of planting compatible plants together in an irrigation zone. Simply put, low water use plants should be planted with other low water use plants. If drainage in the soil is good, moderate water users can often be placed with either low or high water users. However, low water-using plants should not be placed with high water-using plants because the water needs of one type or the other can not be met and one plant will suffer. Additionally, mixing highs and lows defeats the whole purpose of hydrozoning which if done correctly can save water and help plants stay healthier by tailoring the irrigation system to the hydrozone's particular requirement.

The most important part of a water wise landscape is a good irrigation system, which includes a schedule that changes with the seasons and an operator who will adjust the controller at least monthly. The schedule can be changed easily by using the water budget feature found on most controllers; by pushing a button, the run time can be increased or decreased by a time factor measured in percent. For example, in September you can decrease the amount of run time by 30 percent by pushing the button until it reads 70 percent. That means that the sprinklers will apply 70 percent the amount of water it would at the maximum schedule (such as needed in July). The schedule should be changed at least monthly as the climate changes and plants require more or less water. This is especially important in fall because in many places plants need less water because either the plants are beginning to go dormant or it is cooler at night. By winter in many places the controller should be turned off. If irrigation is required in the winter (such as in low desert areas), running the irrigation system occasionally should fulfill the water needs of plants. At minimum, a sprinkler system shouldn't have any leaks or misaligned heads. It should also have good head to head coverage and matched precipitation rates for the sprinkler heads. Drip systems should have emitters of the correct size (gallons per hour) for each plant and they should be moved farther away from the trunk or stem periodically to encourage a large root system.

With a little planning, research and regular maintenance, water wise landscapes can be easy to achieve. The amount of water, time and other resources saved makes it all worth the effort.

Two Upper Sacramento Valley Water Agencies Work Together to Coordinate Regional Water Supply Management System Goals

By Phil Anderson

The Orland Unit Water Users Association and the Tehama-Colusa Canal Authority have teamed up to develop a coordinated regional water supply management system. This project, funded by a CALFED grant managed by the Office of Water Use Efficiency, began with a feasibility study which included the exploration of the regional water management system components including conveyance pipelines, conjunctive groundwater management, and modified operation of reservoirs. Included in the study are the four main regional management objectives which are intended to:

1. insure a long-term reliable water supply to the OUWUA and improve conveyance system and on-farm water use efficiency by modernization of the existing open-channel distribution system,
2. support the long-term Stony Creek environmental restoration and fishery resource management objectives of various state and federal resource agencies,
3. provide supplemental water to supply TCCA service area, and
4. provide supplemental water supply and operating flexibility to support other beneficial water uses within the Sacramento Valley.

Under the future planning assumptions of this study OUWUA will undergo a modernization program that will convert the existing open-channel distribution system to a buried pipe system that will be gravity-fed from the end of an expanded Highline Canal, which will in turn be supplied from the afterbay of Black Butte Dam. The piped distribution system will provide pressurized delivery at varying heads to all points of the system, providing higher conveyance efficiency. The piped system will provide arranged irrigation scheduling and support the use of more efficient on-farm irrigation methods, such as sprinklers and drip irrigation, and replace the existing flood irrigation practices.

The implementation of this regional water plan for the Westside of the Sacramento Valley is still at an early stage of concept development and initial feasibility screening. The results of this concept-level feasibility study will require extensive further refinement and integration with other regional planning efforts to better define and confirm the potential water management benefits. There is much more work to be completed towards the evaluation of water conservation, hydrology, reservoir operations, capital, potential environmental impacts and benefits for this region.

Tehama-Colusa Canal Authority *delivers Central Valley Project water that supplies the 17 member districts that serve approximately 100,000 acres of irrigated farmland located in Tehama, Glenn, Colusa and Yolo Counties. The service area and conveyance facilities of TCCA stretch approximately 80 miles from Red Bluff to Zamora in Yolo County.*

Orland Unit Water Users Association's *service area is located about 30 miles south of Red Bluff, along the western side of the Sacramento Valley. The OUWUA distribution system includes approximately 125 miles of canal and laterals. Nearly 90 percent of the distribution system channels are concrete lined, including all main canal reaches. The cropping patterns in the OUWUA service area include approximately 25 percent orchards including almonds, olives, oranges, prunes and walnuts. Irrigated pasture comprises 62 percent of the total acreage, and is used by either local dairy or other types of livestock operations. Field crops such as alfalfa, other hay crops, oats, corn and wheat constitute the remaining 13 percent of agricultural land. Most of the lands within OUWUA are irrigated using furrow or basin flood methods.*

Objectives

(Continued from page 2)

The degree and type of wastewater treatment that is provided to make recycled water suitable for use depends on the types of use, the potential exposure of humans to recycled water and the public health implications, and the water quality required beyond health considerations. The basic levels of treatment include primary, secondary and tertiary, but not all wastewater receives all three levels of treatment. Secondary treatment is commonly the minimum level of treatment for discharge to surface waters and for many uses of recycled water. Tertiary treatment is sometimes required for discharge to surface waters to protect fisheries or protect some uses of the waters. Tertiary treatment is often required for recycled water where there is a high degree of human contact. Disinfection is usually required for either discharge or recycled water use to kill viruses and bacteria that can cause illness. The Department of Health Services specifies the levels of treatment for recycled water and publishes the standards in Title 22 of the California Code of Regulations. For more information visit www.owue.water.ca.gov/recycle.

Agricultural Water Management Council

By Mike Wade

Progress continues with the Agricultural Water Management Council's outreach program. Current membership covers approximately 3.7 million acres of irrigated cropland. With a goal of 3.8 million acres to be covered under water management plans by the end of 2003, efforts will focus on the signing up of the next 100,000 acres.

Currently, AWMC has endorsed water management plans for over 30 irrigation and water districts. Those plans are being audited according to guidelines stipulated in the Cooperative Agreement signed between AWMC, DWR and USBR. Each audit will determine whether the plan under review meets the obligations set forth in AWMC's Memorandum of Understanding, or guidelines. In addition, two plans will be selected each year for a full audit, which is a comprehensive review of each plan's elements including a full review of its net benefit analysis calculations. The result of these audits will be verification of the water management plan development process and an assurance that the plan is meeting the local needs of the district.

The CALFED Bay-Delta Authority is actively involved in AWMC activities. CALFED has a list of Quantifiable Objectives, or goals, that may benefit water quality, quantity, and in-stream flow and timing. These QOs are currently being integrated into the water management plans. CALFED is using plan information to determine where benefits may occur due to improved water management at the district level. In addition, CALFED will be able to use collected data to determine where future funding may be necessary to further improve water management when it is not locally cost effective. For more information visit www.agwatercouncil.org.

Desalination of Irrigation Drainwater: An Untapped Resource

By Jose Faria

(A summary of an article/presentation by Scott R. Irvine, Jose I. Faria, Jason Phillips, Michael Delamore, Michelle Chapman, Michael K. Price)

Under pressure to reduce consumption of Colorado River water and faced with a growing population, California is vigorously pursuing desalination of alternative water supplies. As a result, the U.S. Bureau of Reclamation is proceeding with plans to desalinate irrigation drainage water in the San Joaquin Valley. In February 2000, the U.S. Court of Appeals for the Ninth Circuit (appealed from the U.S. District Court for the Eastern District of California, Oliver W. Wanger, District Judge, presiding) affirmed a lower court ruling that USBR must provide drainage service to the irrigators in the San Luis Unit, which comprises an area of more than 700,000 acres.

USBR recently completed a year-long effort to evaluate various alternatives for the treatment and disposal of about 150,000 acre-feet of drain water per year. The study produced a final preferred alternative that consists of the following components:

- **Drainwater collection and reuse** Drainwater from commercial agriculture is collected in tile drains and conveyed to four regional reuse facilities where it is used to irrigate salt tolerant crops. Approximately 75 percent of the applied drain-water is lost to evapotranspiration. The remaining 25 percent of the applied drainwater percolates through the soil column to the water table below the reuse facilities. Tile drains collect the reused drainwater for subsequent treatment and disposal.
- **Desalination** Drainwater from the reuse facilities is treated by reverse osmosis (RO) to produce desalted product water that is blended with and reused for irrigation water of commercial crops. Product recovery is limited to about 50 percent by extremely high hardness. Long-term projections of the water quality indicate that the reused drainwater hardness will increase to the point that even 50 percent recovery will not be feasible for some portions of the Unit.
- **Biological treatment to remove selenium** High selenium levels in the drainwater and RO concentrate pose a toxicity hazard to exposed waterfowl and a regulatory hurdle for final disposal. Various biotreatment technologies have demonstrated removal of 80 to 95 percent of the selenium and conversion to a less hazardous form.
- **Disposal to evaporation ponds** Treated drainwater and RO concentrate are conveyed to three regional evaporation pond systems. Salts precipitate and accumulate at the bottom of the ponds during evaporation and will require periodic excavation and burial of accumulated salts. Construction of mitigation wetlands is required to compensate for unavoidable wildlife impacts resulting from exposure to selenium.

Water quality analyses and projections of future water quality indicate there will be substantial challenges for desalting the drain water. The total dissolved solids concentration is expected to range between 5000 and 20,000 mg/L across the San Joaquin Valley over the 50-year planning period. The drain water also contains boron (>20 mg/L), which is not well rejected by reverse osmosis membranes below pH 10, and the product

Continued - See "Desalination" on page 15

CALFED Bay-Delta Program Water Use Efficiency Element Part 2 of 3

This is the second of a three part series about CALFED's Water Use Efficiency Program Element. The first article introduced the program. This article focuses on the agricultural, urban, managed wetlands and recycling components of the WUE Element.

By Mark Roberson and Mary Ann Dickinson, California Bay-Delta Authority, and California Urban Water Conservation Council

The CALFED Water Use Efficiency (WUE) Element—one of several common CALFED Program elements†—is one of the cornerstones of CALFED's water management strategy. The WUE Element consists of agricultural, urban, water recycling and managed refuges. The WUE Element is based on the recognition that although efficiency measures are implemented locally and regionally, the benefits accrue at local, regional and statewide levels. The WUE element has three main goals that support the overall CALFED effort: reduce water demand through "real water" conservation, improve water quality by altering volume, concentration, timing and location of return flows and improve ecosystem health by increasing in-stream flows where necessary to achieve targeted benefits.

Agricultural Component

The purpose of the Agricultural WUE component is to develop and carry out a prioritized, strategic and aggressive program for the achievement of the CALFED goals and objectives throughout the CALFED program area.

CALFED recognizes that a strong emphasis on efficiency is already reflected in many outstanding water use efficiency efforts throughout the state; California irrigation districts and growers have implemented many pioneering methods to manage water supplies and improve efficiency. The CALFED Agricultural WUE component is structured to build on and expand these existing efforts. The Agricultural WUE strategy—developed by a multi-disciplinary technical team that includes experts in water conservation, water quality, resource economics, irrigation engineering and local operations expertise recognizes that—the Central Valley consists of numerous sub-regions, each with its own needs and local hydrologic distinctions and locally based actions can help CALFED achieve multiple, statewide objectives related to water quality, quantity and in-stream flow and timing.

In meeting these, a specific listing of CALFED related goals that are affected by irrigation water management practices have been identified. These are called Targeted Benefits and they originate mainly from CALFED's Ecosystem Restoration and Water Quality elements as well as and local knowledge of flows to salt sinks. The WUE element has identified 196 Targeted Benefits that relate to water quality, quantity and in-stream flow and timing. The targeted benefits are quantified by month and year type (such as wet or dry). Targeted benefits are specific for the sub-regions that represent the Central Valley.

Targeted benefits are quantified by comparing the identified need to the existing condition. For example, the CALFED Ecosystem Restoration element has specified the in-stream flow and timing needs for the Stanislaus River. The incremental flow need is determined by comparing the existing Stanislaus River flow to the targeted flow need. The difference between the existing flow and the targeted flow need is then what may potentially be achieved by making flow path changes on the agricultural landscape—these flow path changes, coupled with local economics are called Quantifiable Objectives.

Quantifiable Objectives represent a first order approximation of the practical and cost-effective contribution irrigated agriculture can potentially make toward the Targeted Benefits. The approximation is based on sub-regional water balances and economic evaluations of water management actions. In some cases, local water management action can potentially achieve all of the quantified Targeted Benefit. In others, the need is greater than can be met by WUE. The purpose of the Quantifiable Objectives is for local agencies to use them to propose water management actions that provide benefit to the water supplier and to the state.

The CALFED WUE element has prepared a list of 196 Targeted Benefits, a complete listing of the Targeted Benefits and Quantifiable Objectives are found at www.calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml.

Urban Component

The goal of CALFED's Urban WUE Program is to reduce the demand on the Bay-Delta estuary by accelerating conservation and recycling actions throughout the state. In its Record of Decision, CALFED states two specific reasons for promoting water use efficiency as part of its necessary solution strategy:

- Water use efficiency investments can yield real water supply benefits to urban users in the short term, especially compared to surface

storage and major conveyance improvements that will take at least five to ten years to complete; and

- Water use efficiency investments can generate significant benefits in water quality and timing of instream flows, even where they may not generate a net increase in available consumptively used water.

The numeric savings targets are ambitious. The CALFED program is hoping to achieve between 520,000 and 688,000 acre-feet from the urban water utilities alone. To achieve these savings, a two-pronged approach was devised: a water use efficiency certification program, and an incentive program of grants and loans.

Certification

The proposed certification program is based upon the Memorandum of Understanding Regarding Urban Water Conservation in California, originally signed by water agencies and environmental groups in December 1991. The fourteen Best Management Practices (BMPs) embodied in the current version of the Memorandum are the standard for the CALFED urban water use efficiency certification program, and cost-effective compliance with these BMPs will be measured and certified by the State Water Resources Control Board under a proposal that will be sent to the state Legislature for consideration. The California Urban Water Conservation Council will assist the State Board in determining certification compliance by providing data on BMP implementation from the Council's BMP Reporting database, which water agencies currently report to every two years.

The proposed certification program will apply to all urban water agencies hydrologically connected to the Delta and serving 3,000 or more urban customers or delivering 3,000 or more acre-feet per year to urban areas. Essentially, this is the same threshold that is currently required under the Urban Water Management Planning Act. However, depending upon the size of the retail or wholesale water agency, differing requirements for certification will apply.

- From 3,000 to 20,000 **retail** connections: Water agencies will submit BMP reports every two years and no further requirements apply.
- More than 20,000 **retail** connections: Water agencies will submit BMP reports every two years AND will file any BMP exemption applications with the State Board every two years for advance approval AND will undergo State Board review for certification every four years.
- From 3,000 to 20,000 acre-feet of **wholesale** deliveries: Water agencies will submit BMP reports every two years; and no further requirements apply.
- More than 20,000 acre-feet of **wholesale** deliveries: Water agencies will submit BMP reports every two years AND will file any BMP exemption applications with State Board every two years for advance approval AND will undergo State Board review for certification every four years.

CUWCC will assist the State Board in determining compliance with the BMPs and will also provide technical assistance to water agencies. Legislation for this certification program will likely be submitted to the 2004 Legislature. If enacted in the 2004 Session, certification could begin in 2006.

The CALFED Bay-Delta Program *is an unprecedented effort to build a framework for managing California's most precious natural resource: water. The Program, developed over the past five years, represents a cooperative effort among 23 state and federal agencies and the public to develop a long-term, comprehensive plan to restore the ecological health and improve water management for beneficial uses of the Bay-Delta system.*

Recycling Component

The approach to urban recycling includes feasibility planning that is part of the urban conservation certification effort. Presently all urban water agencies that are required to prepare urban water management plans under California Water Code Section 10610 *et seq* also must prepare a water recycling feasibility plan as part of the process. CALFED will help urban water suppliers comply with these requirements by assisting local and regional agencies with preparing feasibility plans.

Assistance with feasibility planning will include providing a guidebook and evaluation-decision software to help local and regional agencies more easily and uniformly assess the economic feasibility of water recycling projects and develop a financing plan. CALFED will work with local and regional agencies and other stakeholders on a best management practice for water recycling that would apply to water suppliers and wastewater utilities. Finally, CALFED feasibility planning assistance will include identifying and encouraging opportunities for water suppliers and wastewater utilities to partner in regional projects that provide opportunities to transfer recycled water.

California Urban Water Conservation Council

By Mary Ann Dickinson, Executive Director

CUWCC to Host Amy Vickers Conservation Workshop

Noted author Amy Vickers will be teaching a water conservation techniques workshop September 22-25 in Sacramento. This four-day workshop will feature detailed instruction based on her book, *Handbook of Water Use and Conservation*, and will also feature field trips in the local area. Cost for the workshop will be $250 for the four days, and will cover continental breakfast and hot lunches all four days as well as bus transportation to the field trips. Pre-registration is required and space will be limited. For registration information, contact Jeffrey at the Council office at (916) 552-5885.

The course will cover water use efficiency measures in detail, but will also focus on the "Ten Key Steps to a Successful Conservation Program" that are outlined in the *Handbook*. These ten steps will be discussed with case studies and examples from all over the country as well as California. Although the workshop will primarily be directed toward the urban sector, one afternoon of the workshop will cover the agricultural efficient water management practices.

CUWCC Adds BMP Information to its Web site

CUWCC has added new web pages on the Best Management Practices to its Web site. These pages are located in the Signatory Member Area, and are specifically designed to be regularly updated with new information. There is a page for each of the 14 BMPs, which includes frequently-asked questions on implementation requirements, case study examples of successful programs, reference materials which can be borrowed from the CUWCC library, sample ordinances to download, and Web links for more information. Downloadable publications of interest are also included.

As part of its Web site upgrade, CUWCC will be compiling an electronic "ordinance library " and posting them on its Web site. The categories of ordinances are:

- BMP 13/Municipal water waste prohibition
- Landscape Retrofit
- Landscape water budgets/AB 325 water budgets
- Rates
- Plumbing Retrofit on Resale
- Indoor Plumbing and Code Changes
- Graywater
- Recycled water
- Pressure regulation
- Land Use and Development retrofit credit

If your agency has ordinances you would like posted on the site, e-mail them to jeffrey@cuwcc.org.

CUWCC is striving to increase its technical assistance that it provides to water agencies. These BMP pages and Ordinance Research supplement other web products that have been in place for a number of years. Chief among these developments is the *WaterLogue*, a product and appliance newsletter that features the latest information on water conservation devices and technological developments in the field. The May, 2003 issue of the *WaterLogue* features a detailed article on the new weather-based irrigation controllers and can be found in the Product News Section of CUWCC Web site, www.cuwcc.org.

Study Published on Free Riders in ULFT Programs

CUWCC has published its long-awaited study on the effects of free riders on ultra-low-flow toilet replacement programs. Completed in December 2002, the study examined four mature toilet distribution programs of varying types, and compared the rates of free riders—the rates of those who took advantage of the water agency financial incentive when they would have replaced the toilet anyway. This study illuminates for the first time the range associated with free rider cost; each individual program benefits vary, however, and each program must still be evaluated on its own merit. The most important output of the study is the information that it provides on how to design a ULFT program in order to minimize the free rider potential.

The study is available from CUWCC for $25. Contact Jeffrey at (916) 552-5585 or purchase the report online at www.cuwcc.org in the publications section.

Water Conservation Newsbriefs

Pump Test, Repair Money Available

The Center for Irrigation Technology, through a grant program from the California PUC, is offering money to cover the cost of pump testing and approved well repairs. All owners or users of agricultural electric accounts that pay the public goods charge on their bill are eligible. The program is handled on a first come-first serve basis and available funds are limited. Pump tests are performed by CIT approved testers, who handle all the necessary program paperwork. Tests are available for electric and natural gas powered pumping plants. Those with diesel powered pumps need to contact CIT to determine eligibility. Incentives are available for repairs and retrofits for working electric and natural gas motors. Projects not covered under this program include fuel and system type conversions. For a complete list of covered repairs and other conditions, Call CIT at (800) 845-6038 or visit www.pumpefficiency.org.

Pipeline to Expand Seawater Intrusion Protection

The Orange County Water District has begun construction on a pipeline that will help provide additional protection to Orange County's vast groundwater basin from saltwater intrusion. The pipeline, running from Ellis Avenue and Ward Street in Fountain Valley to Adams Avenue near the Santa Ana River, is being built as part of the Groundwater Replenishment System, an innovative project designed to deliver a new supplemental source of high quality water. The GWR System will take highly treated sewer water from the Orange County Sanitation District, which is currently sent to the ocean, and purify it to drinking water standards or better using reverse osmosis, which is used by many bottled water companies. The additional water will be used to expand the seawater intrusion barrier as well as provide a new source of highly quality water to improve the overall quality of the water in the groundwater basin – the primary source of water for north and central Orange County residents. The 9,000 feet of new pipeline will deliver the additional water to the barrier, once the project is completed in 2007. More information on the GWR System can be found by visiting www.gwrsystem.com.

Western Expo 2003 Program

Expect it all at this year's Western Expo on October 22 and 23 at the Las Vegas Convention Center. The expo will feature a full program roster on Business Education Day October 21, and two days of seminars during the show. The Western Expo showcase of new products, services and plant materials has a new twist this year with the addition of a trendy fashion show. Exhibitors will also have an opportunity to be a Game Day Advantage Player giving their company additional exposure during the expo. And the annual Western Expo Golf Event will tee off again at the Siena Golf Course. So, mark your calendar to attend this valuable event.

For more information on the 2003 Western Expo, including booth availability, write, call, fax or e-mail the California Association of Nurseries and Garden Centers, 3947 Lennane Drive., Ste. 150, Sacramento, CA, 95834-1973, phone (800) 748-6214, FAX (916) 567-0505, e-mail association@cangc.org. Also you can visit www.westernexpo.com.

Tune Up

(Continued from page 6)

a hill. For example, early in the year the water needs of plants are low so the curve is low, but as spring progresses the water needs go up and so does the curve. In April the water needs are halfway to the top of the curve; by May it is about 70 percent of the peak and then by June about 90 percent of the peak—the top being peak season in July when need is 100 percent. After July the water needs of plants start to decrease so that by September water needs of plants drop to about half of what was needed in July. Even though it can still be hot in September, plants need less water for several reasons; they are not growing as quickly as earlier in the year, the days are shorter, the sun is lower in the horizon and the air is generally cooler at night.

By thinking about the schedule in terms of percentages of run time, it can be easily adjusted with the seasons. A sample schedule might be: run three times a week in July (100 percent), then use the water budget button to decrease it to 90 percent in August. In September change it to run only two days a week and perhaps again use the water budget feature to shorten each of those run times by a few percent. In October you may be able to change the schedule to run only one day per week and then turn the controller off once it starts raining. Keep a chart of the original schedule and all changes you make so you have a reference point for next year. If the new schedule keeps the landscape healthy and saves water, mark dates on the calendar to use as a guide next season. Since this is only a sample schedule, contact your local water agency for recommendations for your area.

Water Conservation Events

Designer/Manager School of Irrigation 2003
August 14 - September 5

Cal Poly Irrigation Training and Research Center will be conducting 1-3 day classes covering basic soil/plant/water relationships, hydraulics, pumps, chemigation, row crop drip, micro-irrigation, and irrigation scheduling. Attend one day or the entire 3 1/2 weeks. Classes cover material for the Irrigation Association certification program including CID-Drip and the new Certified Ag Irrigation Specialist. Co-sponsor: U.S. Bureau of Reclamation, Mid-Pacific Region. Each description gives highlights of the course content, any suggested prerequisite, PCA credits available, dates offered, and course fee. All fees include class materials, software, and lunch. For more information visit www.itrc.org/classes/DesMgr.html.

AGRICULTURE/LANDSCAPE COURSES

Basic Soil, Plant and Water Relationships
August 14-15
Cost: $275
Topics include IA Level II material, texture and structure, water holding capacity, retention, intake rates, evaporation, transpiration, soils classification and measurement of soil moisture and tension.

Basic Pipeline Hydraulics
August 18-19
Cost: $275
Topics include pipe materials and sizes, mainline computations, tapered pipe, branches, energy equation, friction, elevation changes and minor losses. *Deduct $20 if you bring your own laptop computer to this class.*

Pumps I
August 20
Cost: $165
Topics include pump curves, pumps in series and parallel, system curves, TDH computations for vertical and booster pumps, efficiency, WHP, BHP, input HP and pump selection from catalogs.

AGRICULTURE COURSES

Chemigation
August 21
Cost: $165
Topics include fertilizers, techniques for various irrigation methods, reducing leaching losses, injection equipment and safety.

Pumps II
August 21-22
Cost: $165
Suggested prerequisite: Basic Pipeline Hydraulics, Pumps I
Topics include NPSH, submersible pumps, well screens and well development, variable speeds (electric and engine), shaft losses, shaft sizing, maintenance and trouble-shooting. This class sponsored by the USBR, Mid-Pacific Region.

Row Crop Drip Irrigation
August 22
Cost: $165
Suggested prerequisite: Basic Pipeline Hydraulics
Topics includedesign layouts, flushing, fittings, how design relates to management, hose installation and retrieval.

Drip/Micro Irrigation Design
August 25-27
Cost: $400
Suggested Prerequisite: Basic Soil, Plant & Water Relationships; Basic Pipeline Hydraulics; Pumps I
Topics include filtration, step-by-step design procedure of hardware selection and hydraulics, emitter and micro system designs, buried drip for trees and vines, plugging prevention and new ITRC book and software. *Deduct $20 if you bring your own laptop computer to this class.*

Irrigation Scheduling, Salinity and Drainage
August 28-29
Cost: $275
Suggested prerequisite: Basic Soil, Plant and Water Relationships
Topics include ETo and crop coefficients, practical irrigation scheduling, how efficiency and uniformity influence scheduling, drainage concepts and layouts, salinity and leaching requirements, reclamation.

LANDSCAPE COURSES

Water Budget Manager
August 25-26
Cost: $275
Suggested prerequisite: Basic Soil, Plant & Water Relationships; Basic Pipeline Hydraulics
This course replaces the Landscape Irrigation Auditor course

Landscape Sprinkler Design
August 27
Cost: $165
Suggested prerequisite: Basic Soil, Plant & Water Relationships; Basic Pipeline Hydraulics
Topics include application rates, valves, piping, pipeline sizing and sprinkler selections, designing blocks

Microirrigation For Landscape
August 28
Cost: $165
Topics include hydraulics of hoses, emitters, and sprayers , equipment selection and maintenance of the system and matching equipment to plant materials and other stations.

What's New in Irrigation System Control
August 29
Cost: $40
This 1/2-day class (8am - 12:30pm) class presented in cooperation with Rain Master Irrigation Systems includes a review of stand-alone and central controllers, the latest features and benefits of modern irrigation controller and how to use them and how to evaluate when to consider using a central control irrigation system.

Designing Landscape and Golf Irrigation Systems with Reclaimed Water
September 2
Cost: $130
Designed to help the experienced designer understand the principles involved in using reclaimed water for landscape and golf course irrigation. Learn when to use reclaimed water, precautions to take and sequential steps involved in reclaimed water systems design. Recommended prerequisite courses are Landscape Irrigation Design and Advanced Head Layout. Basic math skills required.

Electrical Troubleshooting Part I: Diagnosing Field Wiring Problems
September 3
Cost: $95
Learn how to property use volt-ohm meters and how to diagnose wiring problems based on their readings. Become skilled in the application of wire-locating equipment. Learn the most effective steps in sorting our confusing electrical problems so you will rarely have to resort to running new wire to solve your problems.

Electrical Troubleshooting Part II: Transformers, DC Systems, 2 Wire Systems and C
September 4
Cost: $175
Topics include dealing with advanced electrical problems such as two wire systems, DC systems, diagnosing advanced problems through amp readings, phasing and grounding and identifying basic sensor problems.

Bidding and Estimating
September 5
Cost: $150
Designed to cover the most effective bidding systems used in irrigation today. Practice compiling bids on real-life systems. Prerequisites: familiarity and experience with the business-end of the irrigation industry. The Business of Irrigation Contracting class is a recommended precursor. Basic math skills required.

Office of Water Use Efficiency Water Recycling Desalination Program - 2003

For more information these events, visit www.owue.water.ca.gov/recycle/news/news.cfm.

AMTA Annual Symposium of the American Membrane Technology Association
August 4-5, 2003
Westin Resort, Boulder, Colorado

Ninth Conference on Design Operation and Costs of Large Wastewater Treatment Plants
September 1-4, 2003
Prague, Czech Republic

2003 WateReuse Annual Symposium XVIII
September 7-10, 2003
Marriott Rivercenter, San Antonio, Texas
Sponsored by the WateReuse Association

International Desalination Association World Congress on Desalination & Water Reuse
September 28 - October 2, 2003
Atlantis Hotel, Paradise Island, Bahamas.

Desalination

(continued from page 9)

water would be reused for irrigation of commercial agricultural crops which are adversely impacted by boron concentrations as low as 5 mg/L. Valley soils contribute selenium to the drain water, which is also rejected by the membranes. The RO concentrate, therefore, will be difficult to dispose of because it will contain elevated levels of selenium that already have proven toxic to wildlife within existing impoundments of concentrated drain water.

An appraisal-level analysis concluded, however, that membrane desalting at 50 percent recovery could be achieved for a portion of the drain water with minimal pretreatment. USBR is currently conducting pilot tests of pretreatment and membrane performance in partnership with the California Department of Water Resources, local farmers, and local water districts to develop the information needed to perform a detailed design and cost estimate for a full-scale desalination plant.

Desalination of irrigation drain water is both technically and economically feasible as part of the overall strategy for providing drainage service to the farmers in the San Joaquin Valley. Additional RO performance and cost data will be published in September 2003, but given the importance and magnitude of agriculture in the San Joaquin Valley, the desalination and reuse of irrigation drain water promises to become a significant and sustainable new resource to augment California's water supplies in the future.

WATER CONSERVATION NEWS
P. O. Box 942836
Sacramento, CA 94236-0001

Address Correction Requested

Water Conservation Legislation

CA AB 514 Water Meters
AUTHOR: Kehoe (D)
INTRODUCED: 02/18/2003
LAST AMENDED: 06/02/2003
Requires certain urban water suppliers that receive water from the Central Valley Project under a water service contract, to install water meters on all service connections to residential and nonagricultural commercial buildings, constructed prior to a specified date, that are located in the service area. Requires water suppliers to charge customers for water based on the actual volume of deliveries, as measured by a water meter. Status: In Senate

CA AB 866 Water Quality
AUTHOR: Pavley (D)
INTRODUCED: 02/20/2003
Includes, as an element for a watershed protection and water management program under the Watershed, Clean Beaches, and Water Quality Act, water conservation, water use efficiency, and water supply reliability. Status: In Senate.

CA SB 56 Water Development Projects: Murrieta Creek Project
AUTHOR: Hollingsworth (R)
INTRODUCED: 01/14/2003
Adopts and authorizes the upstream and downstream portions of the Murrieta Creek Flood Control Project in Riverside County, in accordance with federal law, and with the state's participation. Requires the Riverside County Flood Control and Water Conservation District to carry out the project and to give assurances of local cooperation to the Secretary of the Army. Status: In Assembly

CA SB 277 Natural Community Conservation Plan: Salton Sea
AUTHOR: Ducheny (D)
INTRODUCED: 02/18/2003
LAST AMENDED: 04/29/2003
Authorizes the Department of Fish and Game to approve a natural community conservation plan that is proposed as a condition of, or that is related to, a water transfer between the Imperial Irrigation District and the San Diego County Water Authority if that department makes a certain determination. Status as of 05/29/03: To Assembly Committee on Water, Parks and Wildlife.

CA SB 909 Groundwater Management Plans
AUTHOR: Machado (D)
INTRODUCED: 02/21/2003
Requires a local agency to submit a copy of a groundwater management plan in an electronic format to the California State Library for distribution to the public. Status: To Assembly Committee on Water, Parks and Wildlife.

Definitions

CA AB: California Assembly Bill.

CA SB: California Senate Bill.

Status: "Status" explains where the bill is located in the legislative process. This bill could be in the Senate or in a particular committee to be reviewed or it could be chaptered.

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